Emerging Electrochromic Materials and Devices for Future Displays

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Abstract

With the rapid development of optoelectronic fields, electrochromic (EC) materials and devices have received remarkable attention and have shown attractive potential for use in emerging wearable and portable electronics, electronic papers/billboards, see-through displays, and other new-generation displays, due to the advantages of low power consumption, easy viewing, flexibility, stretchability, etc. Despite continuous progress in related fields, determining how to make electrochromics truly meet the requirements of mature displays (e.g., ideal overall performance) has been a long-term problem. Therefore, the commercialization of relevant high-quality products is still in its infancy. In this review, we will focus on the progress in emerging EC materials and devices for potential displays, including two mainstream EC display prototypes (segmented displays and pixel displays) and their commercial applications. Among these topics, the related materials/devices, EC performance, construction approaches, and processing techniques are comprehensively disscussed and reviewed. We also outline the current barriers with possible solutions and discuss the future of this field.